**Supplementary Table1**

The major substrates and their function of PRMTs.

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| --- | --- | --- | --- |
| **Enzymes** | **Substrates** | **Biological function** | **Ref** |
| PRMT1 | H4R3me2a | Activate transcription via increasing p300 acetylation | (1,2) |
| STAT1 | Activate IFN alpha/beta-induced transcription | (3) |
| p14ARF | Promote p53-independent apoptosis | (4) |
| LCN2 | Facilitate sunitinib-induced upregulation of LCN2-AKT-RB signaling | (5) |
| C/EBPα | Promote the expression of cyclin D1 | (6) |
| RUNX1 | Activate transcription via shedding corepressors and recruiting coactivators | (7) |
| FOXO1 | Block Akt-mediated phosphorylation of FOXO1 | (8) |
| Twist1 | Activate E-cadherin repression | (9) |
| p65 | Block TNFα-induced activation of NF-κB | (10) |
| Gli1  | Activate transcriptional activity of Gli1 | (11) |
| hnRNP K  | Block activation of c-Src | (12) |
| RBM15 | Regulate alternative RNA splicing via reducing RBM15 protein | (13) |
| EGFR | Promote receptor dimerization and signaling activation | (14) |
| ASK1 | Attenuate paclitaxel-induced apoptosis | (15) |
| SMAD7 | Facilitate TGF-β signaling | (16) |
| CDK4 | Block the formation of a CDK4-Cyclin-D3 complex  | (17) |
| RACO-1 | Stabilize RACO-1 and enable RACO-1 dimerization | (18) |
| TOP3B | Attenuate the accumulation of R-loops | (19) |
| PRMT2 | H3R8me2a | Activate Wnt/β-catenin signaling | (20,21) |
| ER-α | Block the expression of cyclin D1 | (22) |
| PRMT3 | H4R3me2a | Promote the expression of miR-3648 | (23) |
| ALDH1A1 | Block the expression of retinoic acid responsive genes | (24) |
| LXRα | Induce lipogenesis | (25) |
| TOP3B | Attenuate the accumulation of R-loops | (19) |
| CARM1 | H3R17me2a | Activate transcription | (26) |
| H3R26me2a | Activate and repress transcription | (27,28) |
| H3R42me2a | Activate transcription | (29) |
| MED12 | Block p21/WAF1 transcription and activate ER-α mediated gene transcription | (30,31) |
| PARP1 | Facilitate replication fidelity  | (32) |
| GAPDH | Inhibit glycolysis | (33) |
| BAF155 | Activate transcription and displace BAF155 by EZH2 | (34,35) |
| PKM2 | Facilitate aerobic glycolysis | (36) |
| MDH1 | Repress mitochondria respiration and inhibits glutamine metabolism | (37) |
| p54(nrb)  | Impair binding of p54(nrb) to mRNAs containing IRAlus | (38) |
| HSP70 | Regulate RARβ2 gene transcription  | (39) |
| RUNX1 | Promote the expression of miR-223 | (40) |
| p300 | Impair binding of p300 to ACT  | (41) |
| HuR | Regulate subcellular localization | (42) |
| LSD1 | Promote deubiquitination and stabilization of LSD1 | (43) |
| Pax7 | Reduce transcription of Myf5 and other Pax7 target genes | (44) |
| PRMT5 | H4R3me2s | Transcription repression | (45) |
| H3R2me2s | Transcription activation | (46) |
| H3R8me2s | Transcription repression | (47) |
| RNAP II | Attenuate the accumulation of R-loops | (48) |
| p65 | Promote NF-κB-induced gene expression | (49) |
| Sm proteins | Facilitate spliceosomal assembly | (50) |
| p53 | Facilitate cell-cycle arrest. | (51) |
| FEN1 | Facilitate PCNA interaction and DNA repair | (52) |
| BCL6 | Promote GC formation | (53) |
| Nucleolin | Transcription activation | (54) |
| EGFR | Attenuate EGFR-mediated ERK activation | (55) |
| cGAS | Block the DNA binding ability of cGAS | (56) |
| ZNF326 | Impair alternative splicing | (57) |
| hnRNP A1 | Promote IRES-dependent translation | (58) |
| CRAF | Enhance the degradation of activated CRAF | (59) |
| 53BP1 | Promote NHEJ repair by stabilizing 53BP1 | (60) |
| Rad9 | Resist to DNA damaging stresses. | (61) |
| E2F1 | Promote proliferation | (62) |
| KLF4 | Inhibit KLF4 ubiquitylation by VHL | (63) |
| RUVBL1 | Promote HR | (64) |
| PRMT6 | H3R2me2a | Repress transcription and facilitate chromosome condensation | (65,66) |
| H3R42me2a | Activate transcription | (29) |
| TOP3B | Attenuate the accumulation of R-loops | (19) |
| CRAF  | Impair RAS binding affinity and downstream MEK/ERK signaling | (67) |
| RCC1 | Promote RCC1 association with chromatin  | (68) |
| FOXO3 | Regulate autophagy and protein degradation | (69) |
| BAG5 | Enhance the degradation of HSC70 | (70) |
| IRF3 | Inhibit the interaction between IRF3 and TBK1 | (71) |
| PRMT7 | H4R3me2s | Repress the miR-24-2 gene | (72) |
| p38MAPK | Promote the expression of PGC-1α  | (73) |
| MRPS23 | Accelerate the degradation of MRPS23 | (74) |
| YY1 and HDAC3 | Inhibit the expression of E-cadherin | (75) |
| PRMT9 | SAP145 | Promote the U2 snRNP for interaction with SMN. | (76) |

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